# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/033,199 | 12/28/2001 | Shivnath Babu | BABU 1-10-42 | 8231 |

| 47394 | 7590 | 12/02/2004 |
|---|---|---|

HITT GAINES, PC
LUCENT TECHNOLOGIES INC.
PO BOX 832570
RICHARDSON, TX 75083

| EXAMINER |
|---|
| LERNER, MARTIN |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2654 | |

DATE MAILED: 12/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 10/033,199 | BABU ET AL. |
| | Examiner | Art Unit | |
| | Martin Lerner | 2654 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.    2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1 to 24* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 to 24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 May 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All    b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

1.    The disclosure is objected to because of the following informalities:

There are numerous instances where the Specification reverses reference

numerals with respect to CaRTSelector 120, Row Aggregator 130, and CaRTBuilder

140.  These instances are at ¶'s [0049], [0056], [0057], [0058], [0074], [0075], [0076],

[0093], [0094], [0114], [0115] and [0142].  Applicants should carefully review these

paragraphs, and accordingly revise reference numerals 120, 130, and 140.

On page 18, ¶ [0047], "$X_1$ $\underline{C}$X" does not appear to be correct.

On page 56, ¶ [0130], "states" should be –stated—.

On page 57, ¶ [0133], the comma should be removed between "different" and

"CaRTs".

On page 58, ¶ [0135], "decreased" should be –decrease—.

On page 60, ¶ [0139], "CaRt" should be –CaRT—.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2.    The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3.      Claims 1, 9, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by

*Fayyad et al. ('882)*.

*Fayyad et al. ('882)* discloses a system and method for database management,

comprising:

"a table modeler that discovers data mining models with guaranteed error bounds

of at least one attribute in said data table in terms of other attributes in said data table" –

the invention evaluates a data database 10 having many records stored on storage

devices; each record in the database 10 has many attributes or fields which for a

representative database might include age, income, number of years of employment,

census data, etc. (column 4, line 60 to column 5, line 2); implicitly, a plurality of records,

where each record has a number of attributes is a table; a data clustering model ("table

modeler") is produced that implements a data mining engine for answering queries

about data records in the database (column 5, lines 20 to 25); accuracy parameters

("guaranteed error bounds") are used to control the clustering; an accuracy parameter

can be the percentage by which the number of points is allowed to deviate from an

expected value or the probability of a tile satisfying the accuracy criterion (column 9, line

63 to column 10, line 42);

"a model selector, associated with said table modeler, that selects a subset of

said at least one model to form a basis upon which to compress said data table" – a

data mining engine 12 forms conclusions about the accuracy of an initial model (M), and

the model is refined until the model more accurately represents the data stored in the

database (column 9, lines 37 to 62); a cluster must satisfy an accuracy requirement for

the model to be judged suitable (column 10, lines 33 to 42); a model represents a

compressed version of records in data database 10 (Abstract).


### *Claim Rejections - 35 USC § 103*

4.      The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

5.      Claims 2, 4, 5, 8, 10, 12, 13, 16, 18, 20, 21, and 24 are rejected under 35 U.S.C.

103(a) as being unpatentable over *Fayyad et al. ('882)* in view of *Agrawal ('311)*.

Concerning claims 2, 10, and 18, *Fayyad et al. ('882)* does not disclose specifics

about the modeling process as employing classification and regression tree (CaRT)

data mining to model attributes. However, *Agrawal ('311)* suggests data mining with

decision trees for modeling records having one or more attribute values may be by

classification and regression trees. (Column 5, Line 63 to Column 6, Line 7; Column 6,

Lines 58 to 67) The stated objective is provide an efficient method for generating a

decision-tree classifier that is compact, accurate, has short training times and is

scalable. (Column 3, Lines 11 to 24) It would have been obvious to one having

ordinary skill in the art to employ classification and regression trees for data mining of

model attributes as taught by *Agrawal ('311)* in the multi-dimensional database record

compression of *Fayyad et al. ('882)* for the purpose of generating decision trees by a

classifier that is compact, accurate, has short training times and is scalable.

Concerning claims 4, 12, and 20, *Agrawal ('311)* discloses pruning for short

training time (column 8, line 40 ff).

Concerning claims 5, 13, and 21, *Agrawal ('311)* discloses pruning for

representing misclassification errors based upon encoding costs (column 9, lines 34 to

54), which is equivalent to a "scoring-based method".

Concerning claims 8, 16, and 24, *Agrawal ('311)* discloses a greedy algorithm

may be used for subsetting (column 8, line 3).


6.      Claims 2, 3, 10, 11, 18, and 19 are rejected under 35 U.S.C. 103(a) as being

unpatentable over *Fayyad et al. ('882)* in view of *Pednault*.

*Fayyad et al. ('882)* does not disclose specifics about the modeling process as

employing classification and regression trees or a Bayesian network. However,

*Pednault* teaches a method for constructing predictive models that involve Bayesian

networks (column 2, lines 20 to 30 and column 2, lines 45 to 52) and classification and

regression trees (column 2, lines 35 to 45). The objective is to provide a method of

handling missing values. It would have been obvious to one having ordinary skill in the

art to employ classification and regression trees or Bayesian networks as suggested by

*Pednault* in the multi-dimensional database record compression of *Fayyad et al. ('882)*

for the purpose of providing a method for handling missing values.

7.      Claims 6, 14, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable

over *Fayyad et al. ('882)* in view of *Chakrabarti et al. ('005)*.

        *Fayyad et al. ('882)* omits selecting a subset based upon a compression ratio.

However, *Chakrabarti et al. ('005)* teaches a method for data mining where a

compression ratio is an indicator of complexity of compressed files. (Column 16, Lines

18 to 25) The objective is to select candidate data patterns from a dataset based on the

variations of support values of a pattern. (Column 5, Lines 4 to 14) It would have been

obvious to one having ordinary skill in the art to select a data subset based upon a

compression ratio as suggested by *Chakrabarti et al. ('005)* in the multi-dimensional

database record compression of *Fayyad et al. ('882)* for the purpose of selecting

candidate data patterns from a dataset.


8.      Claims 7, 15, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable

over *Fayyad et al. ('882)* in view of *Agrawal et al. ('048)*.

        *Fayyad et al. ('882)* does not disclose that a process by which a model selector

selects a subset is NP-hard. However, *Agrawal et al. ('048)* teaches that, in general, an

optimized rule mining problem is NP-hard. (Column 4, Lines 9 to 14) The objective is

to provide a method for identifying database association rules which are optimal at

upper and lower support-confidence borders. (Column 4, Line 30 to Column 5, Line 45)

It would have been obvious to one having ordinary skill in the art that model selection is

an NP-hard algorithm as suggested by *Agrawal et al. ('048)* for the multi-dimensional

database record compression of *Fayyad et al. ('882)* for the purpose of providing

optimal association rules at upper and lower support-confidence borders.


## *Conclusion*

9.      The prior art made of record and not relied upon is considered pertinent to

Applicants' disclosure.

Fayyad et al. ('058), Agrawal et al. ('172), Chakrabarti et al. ('724), Lee et al.,

Rastogi et al. ('016), and Garofalakis et al. disclose related art.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Martin Lerner whose telephone number is (703) 308-

9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to

Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone

number for the organization where this application or proceeding is assigned is 703-

872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).


ML
11/29/04


Martin Lerner
Examiner
Group Art Unit 2654